

CLAIMS

We claim:

1. An expander assembly for a vapor compression system comprising:
a first member movable responsive to flow of a refrigerant; and
a friction device driven by said member for generating heat.
2. The assembly of claim 1, wherein said first member comprises a bladed member attached to a shaft, said bladed member rotatable responsive to flow of a refrigerant.
3. The assembly as recited in claim 1, wherein said first member comprises a piston movable within a cylinder in response to flow of the refrigerant.
4. The assembly as recited in claim 1, wherein said first member comprises a shaft having a vane portion rotatable responsive to flow of refrigerant.
5. The assembly of claim 1, wherein said friction device comprises a heat transfer surface.
6. The assembly of claim 5, wherein said heat transfer surface performs heat exchange with water.
7. The assembly of claim 1, wherein said friction device comprises a friction disk rotatable to develop heat.
8. The assembly of claim 7, wherein said heat developed by said friction disk is related to a load placed on said friction disk.
9. The assembly of claim 8, comprising a load-generating device for controlling said load on said friction disk.

10. The assembly of claim 8, wherein said load generating device varies a load placed on said friction disk for controlling expansion of said refrigerant.

11. The assembly of claim 1, wherein said expander assembly controls expansion of a refrigerant between high and low pressure portions of said vapor compression system.

12. A heat pump water heater assembly comprising:
an expander for controlling expansion of a refrigerant; and
a friction device driven by said refrigerant within said expander for generating heat.
13. The assembly of claim 12, wherein said expander comprises a rotatable member rotatable responsive to flow of a refrigerant.
14. The assembly of claim 12, wherein said friction device comprises a heat transfer surface.
15. The assembly of claim 14, wherein said heat transfer surface performs heat exchange with water.
16. The assembly of claim 15, wherein said heat transfer surface is adjacent water within a water circuit and transfers heat to water.
17. The assembly of claim 12, wherein said friction device comprises a friction disk rotatable to develop heat.
18. The assembly of claim 17, wherein said heat developed by said friction disk is controlled by a load placed on said friction disk.
19. The assembly of claim 18, comprising a load-generating device for controlling said load on said friction disk.
20. The assembly of claim 18, wherein said load generating device varies a load placed on said friction disk for controlling expansion of said refrigerant.
21. The assembly of claim 12, comprising a transcritical vapor compression system.